

Appln No. 09/901,558

Amdt date August 18, 2005

Reply to Office action of June 28, 2005

**Amendments to the Specification:**

Please replace the paragraph beginning on page 4, line 15 through page 5, line 24 with the following rewritten paragraph:

These and other features and advantages of the present invention will be better understood from the following detailed description read in light of the accompanying drawings, wherein:  
SINGLE ENDED ANALOG FRONT END

FIG. 1a is a block diagram showing a pair of analog front ends in a typical central office (CO) and customer premise equipment (CPE) configuration;

FIG. 1b is an illustration of a co-POTS splitter 111 used in conjunction with an isolation transformer 201 and impedance matching resistor R;

FIG. 2 is a block diagram of a typical balanced CO AFE;

FIG. 3 is a block diagram of a typical balanced CPE AFE;

FIG. 4 is a representation of a frequency spectrum typically present on an unshielded twisted pair (UTP) utilized in an xDSL system;

FIG. 5a is a block diagram of an embodiment of a single ended CO AFE, utilizing a two stage AGC amplifier;

FIG. 5b is a block diagram of an embodiment of a single ended CPE AFE;

FIG. 6 is a block diagram of a two stage amplifier utilizing dynamic range control by attenuators[[]];

FIG. 7 is a schematic of a circuit utilizing two stages of attenuation by voltage controlled resistors to limit distortion in a pre amplifier and amplifier;

FIG. 8 is a block diagram illustrating the use of an echo canceling circuit to reduce distortion;

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FIG. 9 is a diagram illustrating the process of distortion reduction by utilizing echo cancellation;

FIG. 10 is an embodiment of distortion cancellation by echo cancellation circuitry that includes elements that are functionally equivalent to the elements shown in the schematic of the Analog Front End (AFE) of FIG.7;

FIG. 11 is a block diagram of an AFE utilizing lightning insensitive filters;

FIG. 12 is a schematic of an embodiment of a CO high pass filter (HPF) that is capable of withstanding lightning; and

FIG. 13 is a schematic diagram of an embodiment of a lightning insensitive filter;

FIG. 14 is a typical lightning profile showing voltage vs. time for a type A or type B lightning profile similar to that used by the FCC; and

FIG. 15 illustrates a single-ended equivalent circuit implementation of a balanced circuit.